

What is claimed is:

1. A cleaning processing system for applying a series of processing for the cleaning processing to a substrate, comprising:

5           a plurality of scrub cleaning units stacked one upon the other to form a multi-stage system; and  
              a substrate transfer mechanism capable of gaining access to all of said plural scrub cleaning units.

10          2. The cleaning processing system according to claim 1, further comprising:

a cleaning processing section including a plurality of said scrub cleaning units; and  
a substrate loading/unloading section for loading and unloading a substrate into and out of said cleaning processing section;

15          wherein said transfer mechanism is capable of gaining access to all of said plural scrub cleaning units and to said substrate transfer section.

20          3. The cleaning processing system according to claim 1, wherein said scrub cleaning unit includes:

a spin chuck for holding a substrate substantially horizontal thereby to allow the substrate to make a planar rotation;

25          a plurality of brushes abutting against the upper surface of the substrate held by said spin chuck thereby to perform a scrub cleaning;

              a plurality of brush holding arms holding said

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plural brushes, respectively; and

an arm driving mechanism for independently driving straight each of said plural brush holding arms.

4. The cleaning processing system according to  
5 claim 1, wherein said scrub cleaning unit includes:

a spin chuck for holding a substrate substantially horizontal thereby to allow the substrate to make a planar rotation;

- 10 a cup arranged to surround the substrate and said spin chuck;

a process liquid supply mechanism for supplying a predetermined process liquid to a predetermined position of the substrate held by said spin chuck;

- 15 a brush abutting against the upper surface of the substrate held by said spin chuck thereby to perform a scrub cleaning;

a brush holding arm for holding said brush; and  
an arm driving mechanism for driving said brush holding arm;

- 20 wherein said cup includes a cylindrical body and upper and lower stage tapered portions inclined from the inner wall of said cylindrical body toward an inner and upper region of said cup thereby to suppress the diffusion of the cleaning liquid supplied to the  
25 substrate held by said spin chuck to the outside of said cup.

5. The cleaning processing system according to

claim 1, wherein said scrub cleaning unit includes:

a spin chuck for holding a substrate substantially horizontal thereby to allow the substrate to make a planar rotation;

5 a plurality of brushes for cleaning the upper surface of the substrate held by said spin chuck;

a plurality of brush holding arms holding said plural brushes, respectively, and;

10 a plurality of arm driving mechanisms for independently scanning said plural brush holding arms.

6. A cleaning processing system for applying a series of processing for the cleaning processing to a substrate, comprising:

15 a cleaning processing section including a plurality of process units for applying predetermined processing to the substrate; and

a substrate loading/unloading section for loading and unloading the substrate into and out of said cleaning processing section;

20 wherein said cleaning processing section includes:

a plurality of scrub cleaning units arranged to }  
form at least upper and lower stages; }

a substrate inverting unit for turning the  
substrate upside down;

25 a substrate transit unit for temporarily disposing the substrate thereon for the transfer of the substrate to and from said substrate loading/unloading section;

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and

a substrate transfer mechanism capable of gaining access to all of the process units including said scrub cleaning unit, said substrate inverting unit, and said substrate transit unit thereby to perform transfer of the substrate among said process units.

7. The cleaning processing system according to claim 6, comprising a plurality of said substrate transit units, at least two substrate transit units being stacked one upon the other.

10 8. The cleaning processing system according to claim 6, comprising a plurality of said substrate inversion units, at least two substrate inversion units being stacked one upon the other.

15 9. The cleaning processing system according to claim 6, comprising a plurality of said substrate transit units and a plurality of said substrate inversion units, at least two substrate transit units being stacked one upon the other and at least two substrate inversion mechanisms being stacked on the uppermost stage of said substrate transit unit.

20 10. The cleaning processing system according to claim 6, wherein said substrate inversion unit includes:

25 a substrate relay section for performing the substrate transfer to and from said substrate transfer mechanism;

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a lift mechanism for vertically moving said substrate relay section; and

a substrate inversion mechanism for holding and receiving the substrate held by said substrate relay section, inverting the held substrate by rotation, and transferring the substrate onto said substrate relay section.

11. The cleaning processing system according to claim 6, further comprising a filter fan unit arranged in an upper portion of said cleaning processing section for guiding downward a clean air into said cleaning processing section.

12. The cleaning processing system according to claim 11, wherein said substrate transfer mechanism comprises a transfer member movable within a moving space extending in a vertical direction.

13. The cleaning processing system according to claim 12, wherein said substrate transit unit and said substrate inversion unit are arranged in contact with said substrate loading/unloading section, and said clean air flowing downward flows from the moving space of said transfer member into said substrate loading/unloading section through said substrate transit unit.

25 14. The cleaning processing system according to claim 6, wherein two scrub cleaning units are stacked one upon the other to form upper and lower stage scrub

cleaning units.

15. The cleaning processing system according to  
claim 14, wherein said scrub cleaning unit arranged to  
form the upper stage is used for cleaning the front  
5 surface of the substrate, and the scrub cleaning unit  
arranged to form the lower stage is used for cleaning  
the back surface of the substrate.

10 16. The cleaning processing system according to  
claim 15, wherein a vacuum suction mechanism is used in  
the chuck for holding the substrate in the scrub  
cleaning unit for cleaning the front surface of the  
substrate, and a mechanical holding mechanism is used  
in the chuck for holding the substrate in the scrub  
cleaning unit for cleaning the back surface of the  
15 substrate.

17. The cleaning processing system according to  
claim 14, further comprising a filter fan unit arranged  
in an upper portion of said cleaning processing section  
for guiding downward a clean air into said cleaning  
20 processing section, the clean air being guided directly  
from said filter fan unit into said upper stage scrub  
cleaning unit.

25 18. The cleaning processing system according to  
claim 17, further comprising a pipe joining said upper  
stage scrub cleaning unit and said lower stage scrub  
cleaning unit, the clean air supplied from said filter  
fan unit into said upper stage scrub cleaning unit

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being guided into said lower stage scrub cleaning unit through said pipe.

19. The cleaning processing system according to  
claim 17, further comprising a sub-filter fan unit  
arranged in an upper portion of said lower stage scrub  
cleaning unit and a pipe joining said filter fan unit  
and said sub-filter fan unit, the clean air being  
guided from said filter fan unit into said lower stage  
scrub cleaning unit through said pipe and said sub-  
filter fan unit.

20. The cleaning processing system according to claim 6, wherein said cleaning processing section includes a plurality of thermal processing units for applying a heating or cooling treatment to a substrate.

15            21. The cleaning processing system according to  
claim 20, wherein said plural thermal processing units  
are stacked one upon the other in the vertical  
direction.

22. A cleaning processing apparatus for applying  
20 a cleaning processing to a substrate, comprising:

a spin chuck for holding a substrate substantially horizontal for planar rotation of the substrate;

a cup arranged to surround said spin chuck;

a brush for cleaning the upper surface of the

25 substrate held by said spin chuck;

a brush holding arm for holding said brush;

an arm driving mechanism for driving said brush

holding arm; and

a partition wall arranged to separate (the arranging section) of said cup from (the arranging section) of said arm driving mechanism.

5           23. The cleaning processing apparatus according to claim 22, wherein said partition wall includes an open portion and said brush holding arm extends through said open portion thereby to be positioned between the arranging section of said cup and the arranging section 10 of said arm driving mechanism.

10          24. The cleaning processing apparatus according to claim 22, wherein said cup includes a cylindrical body and upper and lower stage tapered portions inclining from the inner wall of said cylindrical body 15 toward an inner upper portion of said cup thereby to suppress the diffusion of the cleaning liquid supplied onto the substrate held by said spin chuck to the outside of said cup.

20          25. The cleaning processing apparatus according to claim 22, further comprising a brush cover arranged outside said brush and on the side of said arm driving mechanism thereby to suppress the scattering of the cleaning liquid toward said arm driving mechanism during the cleaning processing.

25          26. The cleaning processing apparatus according to claim 22, further comprising:

a process liquid supply mechanism for supplying a

process liquid from outside said cup toward substantially the central portion of the substrate held by said spin chuck; and

a controller for controlling the timing of  
5 supplying said process liquid such that the process liquid supplied from said process liquid supply mechanism does not collide directly against said brush when said brush moves along the substrate while abutting against the upper surface of the substrate.

10 27. A cleaning processing apparatus for applying a cleaning processing to a substrate, comprising:

a spin chuck for holding a substrate substantially horizontal for planar rotation of the substrate;

15 a cup arranged to surround said spin chuck;  
a brush arranged to abut against the upper surface of the substrate held by said spin chuck for performing a scrub cleaning;

a brush holding arm for holding said brush;  
an arm driving mechanism for driving said brush holding arm;

20 a cleaning liquid supply mechanism for supplying a cleaning liquid to the substrate held by said spin chuck; and

25 a brush cover arranged outside said brush and on the side of said arm driving mechanism for suppressing the scattering of a cleaning liquid toward said arm driving mechanism during the cleaning processing.

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28. The cleaning processing apparatus according to claim 27, wherein said brush cover is arranged such that the lower end of said brush cover is positioned below a line joining the center of the substrate held by said spin chuck and the upper end of said cup.

29. The cleaning processing apparatus according to claim 27, wherein said brush cover is arranged to cover partly the outer circumferential surface of said brush in a position where the cleaning liquid spurted from said cleaning liquid supply mechanism is not brought into direct contact with said brush cover.

30. The cleaning processing apparatus according to claim 27, further comprising a brush cover cleaning mechanism for supplying a predetermined cleaning liquid onto the surface of said brush cover, said brush cover being kept clean by allowing a predetermined cleaning liquid to flow along the surface of said brush cover during the cleaning processing using said brush or during (the waiting time) <sup>NAB</sup> of said brush.

31. A cleaning processing apparatus for applying a cleaning processing to a substrate, comprising:

a spin chuck for holding a substrate substantially horizontal for planar rotation of the substrate;

a brush arranged to abut against the upper surface of the substrate held by said spin chuck for performing a scrub cleaning;

a brush holding arm for holding said brush;

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an arm driving mechanism for driving said brush holding arm; and

first and second process liquid spurting nozzles for spurting a process liquid to the substrate held by  
5 said spin chuck;

wherein the process liquid is spurted from said first process liquid spurting nozzle to substantially the center of the substrate held by said spin chuck, and the process liquid is spurted from said second process liquid spurting nozzle to a predetermined position outside the center of the substrate held by  
10  
15 said spin chuck.

32. The cleaning processing apparatus according to claim 31, wherein a predetermined process liquid is spurted from said second process liquid spurting nozzle toward that point of the substrate at which the radius of the substrate held by said spin chuck is divided into a first section on the side of the center of the substrate and a second section on the side of the periphery of the substrate at a ratio of 2 : 1.  
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33. The cleaning processing apparatus according to claim 31, further comprising a controller for controlling the timing of supplying said process liquid from said first process liquid spurting nozzle thereby to prevent the process liquid spurted toward substantially the center of the substrate held by said spin chuck from colliding against said brush when said  
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brush is moved along the substrate while abutting against the upper surface of the substrate.

34. A cleaning processing apparatus for applying a cleaning processing to a substrate, comprising:

5           a spin chuck for holding a substrate substantially horizontal for planar rotation of the substrate;

a plurality of brushes for cleaning the upper surface of the substrate held by said spin chuck;

10          a plurality of brush holding arms for holding said brushes, respectively;

a plurality of arm driving mechanisms for scanning independently said plural brush holding arms; and

              a controller for controlling said plural arm driving mechanisms;

15          wherein at least one of said plural brush holding arms is capable of outrunning the other brush holding arms in the scanning direction.

35. The cleaning processing apparatus according to claim 34, wherein said plural brush holding arms holds different kinds of brushes and/or brushes made of different materials.

36. The cleaning processing apparatus according to claim 34, wherein said controller controls said plural arm driving mechanisms so as to prevent said plural brush holding arms from colliding against each other.